Addis Ababa University

School of Commerce

Department of Project Management

ASSESSMENT ON THE CAUSES OF CONSTRUCTION PROJECT DELAY: IN THE CASE OF TL FOUNDATION SPECIALIST

BY

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A project work submitted to Addis Ababa University, School of Commerce

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Addis Ababa, Ethiopia

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DECLARATION

I, Bezawit Sebsebie Kebede, do hereby declare that this project work entitled "Assessment on the causes of construction project delay in the case of TL foundation specialist", submitted in partial fulfillment of the requirements for the award of the degree of Master of Arts in Project Management to the School of Commerce , Addis Ababa University, through the Department of Project Management, is an authentic work and has not been submitted earlier to any university or institution for the award of any degree, diploma or prize to the best of my knowledge and belief.

BEZAWIT SEBSEBIE KEBEDE

Signature: _____

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ACRONYMS

RII	Relative Importance Index
EPRDF	Ethiopian people revolutionary democratic front

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ABSTRACT

The objective of this study is to identify the causes of construction project delay on the five ongoing projects of TL foundation specialists that are only located in Addis Ababa. In order to do that different delay causing events have been listed under the five main category groups, to identify which event is more important cause of delay than the other is, RII value have been used . To collect the needed data questionnaire and interview were used, using a census method questionnaire was distributed to all the skilled contractors, clients and consultants that are related to the projects of TL foundation specialist. The Result show that the top ten main causes of delay in the case of TL foundation specialist ongoing projects are : (1)Lack of local construction materials in market;(2) Low quality construction materials;(3) Availability of local materials and sourcing;(4)Machineries distribution problem;(5)Late start & resource mobilization to site;(6) Difficulty in project financing (Low financial system);(7) Suspension of works;(8) Lack of availability of imported construction materials and goods on market;(9) Delay in progress payments for completed work;(10) Financing difficulty .Recommendations depending on the results of the study was also given .Out of this the main suggestions given is, since most of the time delay is caused because of lack of equipment's, Low quality of machines and not being available in the local market contractors should be able to handle and be ready with martials that have better quality and also should import all the needed machinery to execute the project. Clients should pay depending on the contractual agreements. ***Keywords:*** *Delay, Delay Causes, foundation specialist*

CHAPTER ONE: INTRODUCTION

1.1 Back Ground of the study

A huge amount of investment is needed on the construction industry since it is a very large, and multifarious. It is known that one of the difficulties that a construction project is facing is delay which leads to costly disputes and adverse relationships amongst project participants. All construction projects usually face schedule over run but the extent to which amount they face delay varies from project to project (Werku Koshe, 2016). In developing countries, construction delay has been one of the limitations for the success of a project. Different literatures were collected on 28 developing countries from journal published from the time of 2006 to 2016. The causes, delay in progress payment by owner, contractors' cash flow problem, improper planning and scheduling, Low site management, and change order by owner during construction, are acknowledged as critical causes of delay in developing countries(Muhammad Saiful Islam, and Bambang Trigunarsyah,2017) .

Delay occurs most frequently in construction project and is also common. A variety of causes contribute to the delay of project completion in the complex interdependencies of a number of tasks. Hence determining the contractual responsibility of delay is the most likely source of dispute in construction projects. Delay can be caused by any of the stakeholders which can be the Employer, the Contractor, and the third party or the force majeure that the parties to a contract cannot control .If the schedule of the project over run than the estimated time then this can lead to losses on society as well as the project cost. The loss caused by a project delay is compensated by the Contractor in principle in the form of 'liquidated damage'.(Alena Vasilyeva-Lyulina, Masamitsu Onishi and Kiyoshi Kobayashi,2015)

In Ethiopia, every phase of a construction project deals with schedule over run and are common difficulty in construction projects. Moreover, it is well known that the delays in construction projects are the major causes of project failure. Corrective project management decision and identifying the main causes of delay should be done in time,

but if not then this will deal to extra cost and extension of time, which gives escalation to dissatisfaction to all the parties involved.(Werku Koshe, 2016).

1.2. Statement of the problem

In general, project delay is defined as time overrun beyond the scheduled project completion time (Assaf and Al-Hejji, 2006).Completion of a project within the estimated time frame is considered to be one of the critical causes for project success (Chan and Kumaraswamy, 1997). However, the majority of construction projects worldwide face schedule delays and this issue has become a chronic problem worldwide (Doloi, Sawhney and Iyer, 2012; Doloi, Sawhney, Iyer and Rentala, 2012; Durdyev et al., 2017). Delay is not an exception for the TL foundation specialist as well.

The first reason to conduct this study is because almost all the project in TL foundation specialist have faced delay. Delay has been the very major obstacle they have been facing. Out of all the projects some of them are

1) For W/ro Letekidan Tekie's Apartment Building (2B+G_9) the service provided was shoring, excavation and earth work. Which was agreed to be completed with a duration of 45 calendar days plus 15commencment day (starting from December 6,2018 and completion date in January 29,2019) but it was actually completed on March 5, 2020.

2) For Yegemiya Trade Mixed use building the service provided was excavation protection installation. Which was agreed to be completed with a duration of 139 working days plus 15 days for mobilization (starting from February 10) which should have been completed in July 14, 2019 but was actually competed on November 13, 2019.

3) Excavation protection installation service was provided for the Oromia cultural center and building, the project was expected to be completed within 65 working days plus 15 days for mobilization (starting from July 24, 2019 and ending date on October 12, 2019) but it was actually completed on November 21, 2019.

4) Excavation protection installation service was provided for the Gift real estate PVT .LTDD.G .It is still an ongoing project which should have been completed on June 29, 2019 but it is still not completed (June 8, 2020).

The second reason this study is conducted is because even though different researches have been done on the same topic which is delay, most of them have focused on the overall construction building project. But this study aims to address specifically the foundation part of the building, which is usually given for sub-contractors. Since foundation is common on all construction project addressing this part can help contribute the overall construction project to be completed within the estimated time.

1.3. Objective of the study

1.3.1 General objective

The general objective of the study is to assess the causes of construction project delay on the ongoing projects of TL Foundation Specialist.

1.3.2 Specific objective

-Assessment on the causes of construction project delay in the case of TL Foundation Specialist

-To identify the main causes of delay on the ongoing projects of TL Foundation Specialist from the client, consultant, contractor and combined perspective and give recommendation on how to mitigate delay.

1.4. Research Question

-What are the main causes of delay?

-what are the main causes of delay from the contractor perspective (TL foundation)?

-What are the main causes of delay from the client perspective?

-What are the main causes of delay from the consultant perspective?

1.5. Scope and limitation

The scope of the study focused on assessing causes of construction delay in the case of TL foundation specialist. This projects are limited on the five ongoing or active projects of TL Foundation Specialist that are located in Addis Ababa only. This five ongoing projects all have already faced delay and not still completed this are Gift real estate PVT LTDD.G,Yeka terara parking, National theater of Ethiopia, Metropolitan and a private building. The events on the causes of delay were adopted from a study done by Neway Seifu,(2019) it doesn't focus on the root causes of delay. Data is gathered through detailed literature review, interview and questioner survey. The contractor, consultant and client are only the participants out of all the different stakeholders.

Covid-19 has also been one of the limitations while conducting this study since employees are staying at home and prefer social distancing at the moment it made the data collection process, conducting an interview and gathering additional documents was very difficult. The other limitation of the study is that availability of research's that were done specifically on the foundation part of the construction industry is very limited. The study only used a descriptive type of research due to the time limitation.

1.6. Significance of the study

The significance of establishing the issue related to the construction project delay will be to provide a better understanding and insight of the causes of delay specially among the main project stakeholders which are the contractor, the consultant and the client .This study will be expected to help create awareness of delay causing factors and the finding can help to improve and guide performance of the TL Foundation Specialist. It can also help on contributing on the knowledge gap that exist on the foundation section of a building construction.

1.7. Organization of the study

The study combines of a general introduction and the overall aim of the paper, related literature, research questions, the methodology used, way of gathering and analyzing

data, recommendation and conclusions. The study contains an organized five chapters as follows:

Chapter one discusses the introduction of the research by highlighting the research problem, research purpose, research objectives, proposed methodology and research organization. While the second chapter presents a literature review or journals that are related to delay so that readers can have a better understanding and can support the study. The third chapter show the data collection method, analysis techniques and statistics used to identify causes of delay on the case of TL Foundation specialist .Mean while chapter four shows the findings from the methodology used to gather information and presents the findings and discussion based on the results obtained from questionnaire and interview responses. Chapter five presents or provides conclusion and recommendation depending on the overall finding of the study.

CHAPTER TWO: LITERATURE REVIEW

2.1Introduction

Literature review is one of the most important parts of a research which helps to support the overall topic by referring to different scholars, construction management books, and related journals. Since the subject of delay have been discussed by different researcher in the past. It helps to transfer issues related to the specific topic which in this case is delay. Delay is becoming a very common thing to face in the current construction projects. This chapter of the research tries to organize the definition of project, project management and delay, the general classification of delay and causes of delay by referring to previously made studies on this topic.

2.2Project management

Different scholars have defined project in different ways some of them are, Project is a time limited work which is done to create some different or unique product or service.," according to the Project Management Institute. Gary R. Heerkens, (2002) also stated that project is a solution for a certain problem, it solves problems. Having a goal to save money or to make money. Projects can have different characteristics, the main once are that they are unique, temporary and uncertain.

Turner (1998), stated that a project uses different resources in order to accomplish a specific work, with in a given specification having a limitation of cost and time having the aim to deliver or achieve the estimated quality.

According to the Project Management Body of Knowledge (1983), there are nine knowledge areas in project management are, this are project integration management ,project scope management , project time management ,project cost management ,project quality management, project human resource management, project communication management, project procurement management and project risk management.

Project time management is more related to the delay or schedule over run of projects. Unless projects are carefully managed regarding to the schedule then it leads to delay of projects. So this paper will focus more delay on construction project.

Knowledge Areas	Project Management Process Groups				
	Initiating Process Group	Planning Process Group	Executing Process Group	Monitoring and Controlling Process Group	Closing Process Group
4. Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work	4.4 Monitor and Control Project Work 4.5 Perform Integrated Change Control	4.6 Close Project or Phase
5. Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
6. Project Time Management		6.1 Plan Schedule Management 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Resources 6.5 Estimate Activity Durations 6.6 Develop Schedule		6.7 Control Schedule	
7. Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
8. Project Quality Management		8.1 Plan Quality Management	8.2 Perform Quality Assurance	8.3 Control Quality	
9. Project Human Resource Management		9.1 Plan Human Resource Management	9.2 Acquire Project Team 9.3 Develop Project Team 9.4 Manage Project Team		
10. Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Control Communications	
11. Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses		11.6 Control Risks	
12. Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	12.4 Close Procurements
13. Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Management	13.3 Manage Stakeholder Engagement	13.4 Control Stakeholder Engagement	

Figure 2. 1project management knowledge area

2.3What is Delay?

Delay or schedule over run has been defined by different scholars. The gap or difference between the estimated completion time of the project and the actual completion of the projects is known us time overrun or delay (Aibinu & Odeyinka, 2006). When the project completion date goes beyond the estimated one then this is called project delay. If projects cannot meet the estimated time, budget, quality then it will have a negative effect on the project. Usually, when the projects are not going according plan or behind schedule it lead to the extra budget. (Abdurezak Mohammed Kuhil and Neway Seifu ,2019).

Muhammad Saiful Islam, and Bambang Trigunarsyah (2017), stated that different stakeholders are involved on the construction project so the involvement of this different parties can lead to difficulty , which means this construction industry can highly be oriented to high risk .Since at every stage of a project estimation is done on time, cost, quality and scope of the overall project .Because of an improper management and other unexpected events or causes delay which can lead to dispute and claim between parties , when it comes to the construction industry delay is the main source of claim and the effect of delay is not well known and identified, which made projects to face delay. Andrew d. ness (2010) ,defined delay from the construction context as being not able to accomplish tasks in the construction activity within the given time frame. Delay on the construction sector is very much related to cost and dispute as well, since “Time is Money “as the time over run then it is directly related to cost.as there is an additional amount of time is added on the planned time of completion then there is also an additional amount of cost on the project.

Shruthi Sivaprakasam,S.Dinesh, J. Jayashree (2017), stated that when It comes to the construction projects time over run or schedule delay is the very major problem that is being faced. When the time goes beyond the estimated time to complete the project then that when it is called construction delay. Determining and analyzing what the main causes of delay or time over run can only help to minimize delay. Arditi et al.,

(1985) time over run or delay does not only affect the project that experienced delay but also it affect the overall economy of the country.

Prasad Kudrekodlu Venkatesh and Vasugi Venkatesan, (2017), stated that if delay occurs then it will lead to cost overrun and can also limit the economic growth .Different researchers have tried to identify the causes of delay on the construction industry or project ,different literatures have been published, most of the construction project face delay in a very high amount .More work should be done on this, on identifying the main causes of delays and ways of mitigation or stopping delay should be identified as well so that the project can be completed within the estimated time and budget .

Abdurezak Mohammed Kuhil and Neway Seifu (2019), as cited by werku koshe and jha (2016), almost all of the construction projects in Ethiopia have been facing delay, to support this the construction Sector Transparency Initiative (CoST) Ethiopia stated that 50% of the governmental financed projects (16 projects) didn't achieve the planned time and budget (Addis Fortune, 2014). Here in Ethiopia around 91.75% delayed 352% of its contractual time and only the remaining 8.25% were finished as planned, within schedule.

As it can be seen from the statements mentioned above delay is a very common problem. This might be caused because due to different reasons and identifying this reasons can help the construction industry to find ways of prevention.

2.4Classification of Delay

Different classification of delay has been given on different journals, these classification of delay have a common ground and linked to one and other .Mensai(2007) and Harry Kent (1995) ,classified delay in to Excusable (which can be compensable and non-compensable), Non- excusable and concurrent. Whereas Twana Ahmed (2016) Dayang et al(2009), Dineshet al.(2017), Theodore j. (2009), Shruthi Sivaprakasam S.Dinesh J. Jayashree (2017) classified delay as critical and

noncritical , concurrent or non-concurrent , excusable (which can be compensable and no compensable),no excusable (which can be compensable and no compensable).

2.4.1Critical and noncritical delay

Shruthi Sivaprakasam S.Dinesh J. Jayashree (2017), stated that a type of delay that have an effect on the overall construction project which can be an addition of money and time to the estimated or planned scope , then those types of delay can be considered as critical delay

. Whereas a delay that doesn't not have any impact on the completion date of the project , this are considered to be non-critical delay type.

Theodore J (2009), stated that the overall concept of a critical delay is related to the critical path method scheduling. Which shows that if there is delay on the activities that are on the critical path which can defiantly have a negative impact on the completion period.

Twana Ahmed Muhammed (2015), it is considered that non excusable and excusable delay both are parts of critical delay and this is because since it affects the completion date or the work progress. So this means non critical delay is not categorized under any of the delay types.

Twana Ahmed Muhammed (2015), also defined non critical delay as a delay that only affect the work progress of the project but not the completion or the end date of the construction project.

2.4.2 Excusable and non-excusable

Twana Ahmed Muhammed (2015), stated that excusable delays are delays which can't be controlled by the contractor or sub-contractor because they are unexpected events that occur and cause delay or time overrun. He mentioned that this can occur because of the following events: labor strikes, Fire, Floods, force major, Owner-directed changes and extra works, Differing site conditions, Late possession of site, because of payment, Unusually severe weather, when extrusive bodies involves, when

governmental bodies could not take action on time , But before concluding that if delay is whether excusable or not then the contract document should be referred.

Theodore J (2009), also added to the above statement by saying that this excusable delay is an event that was not expected at all and it can be categorized as compensable and non compensable delay. Excusable compensable delay is where the sub-contractor and contractor are selected in order to make compensation to the time overrun that occurred which can be additional time and compensation for that matter .A non-compensable delay is even if there is an expected event that occurred to delay the project then the contractor or sub-contractor will not be expected to add an additional time or any compensation, but putting in mind some cases then additional time maybe asked but not money. To identify whether or not it is compensable or non-compensable the contract term should be referred.

Serdar Durdyev (2018), explained non-excusable delay as delays that can be controlled by contractor or subcontractor. Twana Ahmed (2016), also support the sentence above by saying that the contractor is responsible for the delay so he or she will pay liquidated damage. The owner can be entitled for the liquidated damage.

2.4.3Concurrent Delay

Tawan Ahmed (2016), stated that concurrent delay occurs when different delay or time over run causing factors occur at different time of the work progress but when they affect the project at the same time. This delay takes place when and only if the contractor and the owner both delay the project (construction) at an excusable but non compensable delay, but in some cases it might be excusable and compensable as well. Non-concurrent delay is when an activity couldn't be completed within the estimated time and budget or according to plan.

2.5Causes of Delay

There are a various reasons for delay to be caused and different journals have pointed out various reasons but for this specific review. Below I have presented the causes

identified by this researchers and then divide it from the contractor side, the consultant, client side and force major delay.

Werku Koshe, K. N. Jha (2016) , conducted a research and tried to identify the main cause of delay in the construction projects of Ethiopia this was identified through a survey conducted.as stated on the study the main causes of delay in the Ethiopian construction industry are if professionals in the department of construction technology and management are in lack , when payments are not made when needed ,lack of schedule management ,improper resource management ,escalation or escalation of materials used for the project , if the contractor faces financial difficulty , lack of labor availability.

Abdurezak Mohammed Kuhil and Neway Seifu (2019), around 42 cause of delay were identified which was divided to 5 divisions The top ten causes were lack of financing, improper project management system, not preparing the drawings on time, lack of sufficient amount of material for the project, design error,not paying on time for completed work, not executing work on time ,finance problem, not having accurate sit investigation , price escalation. This the above causes were identified as the top 10 points. (Serdar Durdyev and M. Reza Hosseini ,2018), stated that on the review that was done on 97 studies the main causes of delay that cause construction project delay are having a Low communication, misunderstanding between stakeholder , natural causes like weather condition, financial problem , not paying payment on time ,lack of material or equipment, not having the needed amount of experience to execute the work, Low site management and improper management of site were the case identified as the top most commonly occurring causes of delay on the construction project delay .

Firdissa yadeta bayissa (2018), stated that the critical struggle that have been raising on the construction industry are time and cost overrun. Among the most occurring causes of delay the study shows the following are problem on right of way, material and equipment not being available , climate condition, if work stopped for a limited period because of the, because of financial problem were identified as the most delay causing causes on the road construction in Oromia pertinent to road projects.

Different literatures have identified the causes of delay on their previous study below are causes of delay in the construction projects in the middle east region which were gathered by G. Sweis, (2008) as follow at Saudi Arabia Slow preparation and endorsement of shop drawings, Delays in payments to contractors, Changes in design/design error, Lacks of labor supply and Low workmanship were identified to be delay causing factor. At Jordan Low design, Changes in orders or variation, Weather, Sudden site conditions and late deliveries have been the identified causes of delay.

Tawan Ahmed (2016), Trench Frics(1995),Ashraf et al(2016) and other researchers categorized the internal causing factor as consultant , contractor and client.

2.5.1Contractor related causes of delay

Since every stakeholder have their own responsibility when it comes to a construction projects the contractor is responsible to do the work planned according to the time and cost estimated, but if the contractor could not archive that then he or she will be asked to pay liquidated damage as a compensation for the client or owner (Trench Frics(1995).

Muhammad Saiful Islam and Bambang Trigunarsyah(2017), added to the above paragraph by saying that a contractor , sub-contractor ,electric contractor etc have their own roles in achieving the needed thing . in developing countries the main cause of delay was identified as not having a proper planning and schedule to be the main cause of delay, Mochal (2003) also supported this statement .While in southeast Asia incompetent sub-contractor is the second cause of delay In the middle east Low monitoring and control, Low professional experience were identified as the main causes of delay but not in other parts of the world. As ,Enshassi et al. (2009) ,study show the existence of lack of site management and cash flow while execution of project to be the causes of delay. Chitkar, (1998), stated that causes of delay because of contractors can be caused because of improper project management, which can be not being able to plan depending on the realistic and updated work schedule, organization

failure, failure to hold cash flow, lack of knowledge, harmonization failure , controlling and monitoring failure, improper management of resource .

2.5.2 Consultant related causes of delay

Consultants have the responsibility to design and work on specification of the construction project .They can be able to be the cause of delay in a different ways some of the causes mention on the study was Low knowledge, incorrect design and late shop drawing preparation

Consultants are part of the stakeholder on the construction sector, they have their own way of contributing to delay. Some of the causes of delay that might occur because of consultants can be late endorsement of laboratory tests, Design changes, not approving payment on time ,Low briefing of document, Postponement of work will experience a loss of time, and will delayed in doing other projects. (muhammad saiful islam, and bambang trigunarsyah,2017)

Madan Kumar Sha, Padam Bahadur Shahi, Ramananda Pandit, and Ashok Pandey (2017) ,stated that this can be other causes that can also add to the overall cause of delay because of consultant Insufficient consultant experience or knowledge ,Low design and delay in design ,Insufficient project management assistance ,slow response and Low review , incomplete design ,inaccurate site investigation.

2.5.3 Client related causes of delay

Muhammad Saiful Islam, and Bambang Trigunarsyah(2017), stated that the main causes that might be caused because of client is change of variation, improper management, not making decision on time ,lowest bidder selection, Low contract management by owner, not approving decision on time and Insufficient involvement of consultant .But in developing countries change order or variation is considered to be the main cause of delay The factor change order during design got highest priority all over the developing countries, followed by delay in decision making.

Theodore (2009), stated that there are different causes that can cause delay because of the client like late delivery of site ,lack of working knowledge or experience , late decision making , Low harmonization with contractors and communication ,change of order, financial ,slowness in decision making process .Have been identified as the main causes of delay.

Frics (1995), categorized the following under client factor that causes delay as having a fixed budget not considering the fact that budget can change, not providing right of way on time, thinking of changing planes while construction, and suspending the work

2.5.4 External related causes

Divya.R and S.Ramya (2015), stated that there are also other delay causing causes in Malaysia's construction project this are late permits from municipality, regulatory changes, weather effect on construction activities, unexpected accidents during construction, prices escalation of materials ,delay in providing services from utilities. Muhammad Saiful Islam and Bambang Trigunarsyah(2017),also added to Divya.R and S.Ramya (2015) by saying that the studies conducted before show that delay in obtaining permits from local authority ,because of government laws, regulation and bureaucracy, and work accident are the most common delay causes or causes categorized under external causes of factor.

Frics, (1995) categorized the following under external factor that causes delay as force majeure, weather condition, strikes use of fuel or labo r, market instability, government legislation change and government statutes that restricts use of fuel.

2.6 Empirical Review

Ghias ur Rehman (2015), stated that a study was conducted in order to identify the cause of delay through a qualitative research approach. Even though there were only 61 respondents which can be considered as a limitation of the study. This study was able to show the most occurring top 10 causes of delay which were identified from the

stakeholders. The following are defined as improper harmonization with the electro mechanical work, selection of bidder based on lower commercially, late decision making, late arrival of material, variation order, lack of knowledge on planning and scheduling of the project, nonproductive labor and equipment, improper harmonization and issue on the quality of work, late endorsement of design from the client side, unrealistic contract duration.

Xinhai-Lu , Aneesa Bibi , Maloof-ud-Dyian and Wahab Rabbani(2011), stated that the study identified the different delay causes and how they can affect the project success and completion of the project. It also suggested ways of reducing the these delay in the construction projects of Pakistan .In Pakistan delay is usually caused because of natural disaster like flood and earthquake .The other cause of delay is connected to financial difficulty , lack of planning, improper site management ,lack of experience .lack of materials when needed etc.

Syed M. Ahmed (2003), stated that the main aim of this study is to know the opinion of the different stakeholders involved in the project, regarding causes of delays and the types of delay.

Depending on the findings ,it's know that consultants are responsible to do works related to design in conjugation with the client of the project. In addition to that code, design and construction related issues have a negative impact compared to delay in payments according to the study.

According to Odeyinka HA, Yusif A. (1997) , the study done on the Nigerian construction project was divided into the following main causes which are change of order or variation order, payment difficulty in cash flow, late decision making and As for the main contractor related causes of delay in Nigerian construction projects are difficulties in finances, Low site review, lack labor, lack of knowledge while planning and scheduling, and improper material management. Finally everything out of the

control of the stakeholders are added to the external causes of delay on the construction project of Nigeria.

Mezher and Tawil (1996), stated Lebanon's most important cause of delay in the construction projects. The study included randomly selected owners, contractors and consultants which are stakeholders or the project from Lebanon. The study include causes of delay, which are subdivided Into 19 major groups, which the participants were also asked to identify the level of importance of delay.as the finding show the reason for delay in construction project in Lebanon are ; causes related to the client ,contractor and consultant.

2.7 Conceptual Framework of the study

This part of the study helps to see the overall picture of the study depending on the literature review. By developing context of delay on projects and identifying the causes of delay causing factors. It can help us by showing directions on how delay can be caused. The literature review have shown different causes that can be a factor for the cause of delay. So the conceptual formwork have identified the main causes of delay from the stakeholder position and also included other main categories that can highly have an influence on delay.

This conceptual framework is adopted from Ghias ur Rehman (2015).

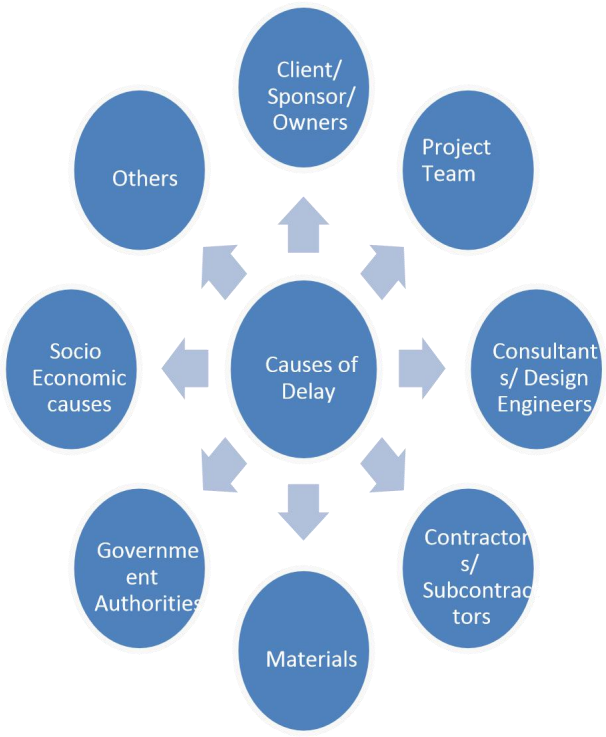

Figure 2. 2: Conceptual Framework for Causes of Delay

CHAPTER THREE: RESEARCH METHODOLOGY

The third chapter mainly depends on explaining the overall ways on how information and data was gathered and also the procedures followed to identify the research design methodology, sample size, target population, data collection way, source of data, and on how this gathered information is analyzed. Putting in mind the main aim of the study is to identify the causes of construction project delay in the case of TL foundation specialist.

3.1 Research design and approach

Throughout this study descriptive type of research is used to assess causes of construction project delay in the case of TL Foundation Specialist. In order to describe or narrate the situation as how it appears. Both qualitative and quantitative (mixed) tool of data analysis is used to gather information through structured questionnaires and interview is used to add and strength the results of the study, so that one can full fill the gap of the other.

3.2 Method of data collection

For the quantitative data collection approach questionnaires was distributed to the contractors, consultants and clients that are related to the project. While Interview was to gather a detail information from the perspective of the client, contractor and consultant.

Questionnaire is adopted from a research done by Neway Seifu-“ Causes of Delay in Public Building Construction Projects: A Case of Addis Ababa City Administration Public Building Construction Projects”(2019)

Different literature’s that are related to delay was gathered and reviewed in order to support the study. Then using a descriptive type of analysis, data’s form the questionnaire and interview were analyzed.

3.3Data sources

The study is mainly dependent on data that were collected or gathered through different tools so that it can be able to achieve the objective of the study. Different literatures are assessed; journals published and unpublished delay related documents, books and others secondary data was included. Additional information were gathered from the targeted respondents which are the contractor, the client and consultant through primary data collection method through questionnaire, interview and case study. Which help to analyze and summarize the result.

3.4 Study population

The total population of this study is the skilled contractor, consultant and client that have direct relationship with the ongoing projects of TL foundation specialist. This are 17 contractors, 21 consultants and 19 clients. The study population are from the five ongoing projects that are only in Addis Ababa. All the relevant people to the objective of the research are considered as a sample of the study, which is a census survey.

The contractor consists of the site supervisor, project engineer, deputy general manager, technical department, project coordinator and assistant project coordinator having a total number of 17members. The consultants have a total number of 21 and clients have a total number of 19.

3.5 Data analysis approach

After collecting different questionnaires from the different stakeholders their answers regarding to the cause of delay can be transformed and analyzed, identified and ranked through a method which are ranking and Computation of Relative Importance Index (RII) through Microsoft excel. The method was used by different researchers before, Pourrostam &Ismail, 2012 also used the above methods.

3.5.1 Ranking and Computation of Relative Importance Index (RII)

Relative Importance Index (RII): is the mean for a factor which gives it weight in the perception of respondents. It is calculated for every of the pointers and ranked accordingly. So each causes of delay on the five point likert scale can be determined by the relative importance index. As the relative important index (RII) is higher or bigger it shows that it is important cause of delay. In order to do that the equation below is used while the relative index range should be between the numbers 1-0

$$RII = \frac{\sum WiFi}{A * N} = \frac{1 * F1 + 2 * F2 + 3 * F3 + 4 * F4 + 5 * F5}{5 * N}$$

Where; i – Represent response category index,
Wi – represent the weight given by respondents,
Fi – represent the frequency of respondent for
each weight,

A – Represent the highest weight (5 in this case) and
N - The total number of respondents.
RII -The relative important index ranges from 0 to 1.

3.6 Validity and Reliability

While conducting a study or research the reliability and validity of the study should be assure because it helps to evaluate the instrument for the research.

3.6.1 Validity

As stated by Kumar, (2005) and Ndegwa, (2013) validity is about measuring the exact objective or content of the question and it is the amount to which a measuring instrument provides adequate coverage of the topic under study. Also the degree to which the researcher has measured what he set out to measure on the study.

According to Paton (2000), validity is the quality attributed to proposition or measures to the degree to which they conform to established knowledge or truth. Content validity of the research instruments is established in order to make sure that they reflect

the content of the concepts in question and it is the extent to which a measuring instrument provides adequate coverage of the topic under study.

This study used content validity to make sure that the instrument used reflects the content and the concept needed to find the objective this is through, the instrument used was compared with other and was selected because it have all the information needed that can address the objective of the study .To make sure the validity, the advisor helped by guiding the paper as an expert and agreed that the instrument is valid, to support that literature review was also considered .content validity is done through research's done in the previous time.

3.6.2 Reliability

To check the reliability of the research conducted Cronbach's alpha instrument is a commonly used type of instrument, this research also use this method to measure the internal consistency of item in scale. Cronbach's coefficient alpha values range between zero-one. The equation $\alpha= ((k/(k-1))*(1-((\sum(S_i)^2)/(S_t)^2)$ is used in order to find the value , so depending on the results the alpha coefficient of the contractor related cause , consultant related causes, client related causes and finally external and resource related causes it is 0.826,0.721,0.913 and 0.78 respectively . This results are considered acceptable since they have values greater than 0.7.

3.7 General description of the project area

TL Foundation specialist is established 2016. Is the sister company of AFROTSION CONTRUCTION which is grade one contractor .The trading is a privately limited business firm based in Addis Ababa , Ethiopia .It's a setup as a foundation and drilling subdivision .TL Foundation Specialist have an aim of not only to give the service of pilling and shoring in Ethiopia but also across east Africa. They are limited to the service of shoring and pilling on the construction industry of Ethiopia. In addition to the Shoring and pilling of foundation they also work on design and construction works.

TL Foundation specialist have been working on more than 19 projects all over Ethiopia, the project are shoring and pilling projects. Some of the completion are Dessie Ethio telecom, the EPRDF head of complex building, Merkato bus depot and EFS drilling projects are the few.

The mission of the organization is to add to the overall foundation (pilling and excavation service) construction of the industry the visions is to become the first and leading foundation specialty in eastern African region.

CHAPTER FOUR: RESULT ANALYSIS

This chapter includes all the process conducted to collect the data needed for the study. Questionnaire was distributed to all the skilled professionals. This chapter also identifies all the causes of delay that are identified from the contractor, client, and consultant and combined perspective.

Questionnaire was distributed to all stakeholders that had a direct exposure to the ongoing projects done with the TL foundation specialist. Different ways of ranking system were used to identify this causes of delay. To add on this, interviews were also conducted on identifying the causes of delay to some of the key persons from the contractor, consultant and client category. The results are also analyzed and interpreted the main causes of delay are seriously examined under major headings as follow.

4.1Response rate

A number of 57 questionnaires were distributed, out of that 47 were filled and returned back. Around 16 of them were from the client side, 15 from the contractor and 16 from the consultant. Also interview was conducted with 1 individuals from the consultant side, 1 from the contractor and 1 from the client. The table below shows a brief description of the response rate.

Table 4. 1 Respondent profile

Stakeholders	Number of questionnaires distributed	Filled and returned	Response rate in percent
Contractor	17	15	88.23%
Consultant	21	16	76.19%
Client	19	16	84.21%
Total	57	47	82.45%

Source: study conducted

As shown on the table above the total respondent's rate is 82.45%.the response of the respondents is considered adequate for analyzing the data.

4.2 Section one-Demographic Characteristics of the Respondents

This section of the research include the gender, educational background, job status, current educational level and their experience in the construction industry. Out of the returned 47 questionnaires, 25 (53%) are male respondents and the rest 22 (47%) are female. According to this the number of male respondents is high and their participation is also higher than female.

The respondents job status or title is 4(9%) project managers ,4(9%) office/construction head , 8(17%) site engineer , 3(6.%) resident engineer , 7(15%) office engineer , 6(13%) project coordinator ,0 (0%) site inspector,10(21%) contract admin and 5(11%) other .

Out of all the respondents 35(74.4%) of them have a bachelor degree and the rest (25.5%) 12 have master's degree .It shows that this respondents have a relevant and sufficient knowledge to the project.

The percentage of years of work experience of the respondents, (6) 13% of the respondents have 0-3 years of work experience, (19) 40% of the respondents have 3-5 years of work experience, (14) 30 % of the respondents have 5-10 years of work experience, (8)17% of the respondents have more than twenty (10) years of work experience in the building construction sector.

Table 4. 2 Demographic characteristic

Respondent Gender		
Gender	Frequency	Percentage
Male	25	53%
Female	22	47%
Total	47	100%
Educational level		
Educational level	Frequency	Percentage
PHD	0	0
MA/MSC	12	74.4%
BA/BSC	35	25.55%
Diploma	0	0
High school	0	0
Job title		
Job title	Frequency	Percentage
Project manager	4	9%
office/construction head	4	9%
site engineer	8	17%
resident engineer	3	6%
office engineer	7	15%
project coordinator	6	13%
site inspector	0	0%
contract admin	10	21%
Other	5	11%
Work experience		
0-3 years	6	13%
3-5 years	19	40%
5-10 years	14	30%
More than 10 years	8	17%

Source: study conducted

4.3 Section two- assessment on causes of construction project delay

This paper is conducted having the aim of identifying the causes of construction project delay in the case of TL Foundation specialist. This part of the analysis is to identify the causes of delay and ranking the construction delay from the perspective of the client contractor and consultant side or perspective.

4.3.1 Causes of delay from the client perspective

Out of all the causes of delay the top ten causes of delay are identified and shown from the client perspective. As shown on the table below according from the client perspective, the top main causes of delay that are considered to be caused by clients or owners them self's are "Delay to provide and deliver the site to the contractor" and " Low communication and harmonization" which have been categorized among the ten main causes of delay.

Table 4. 3 Ranked causes of delay from the client perspective to client related causes of delay

		5	**4**	**3**	**2**	**1**	**RII**	**RANK**
Client/Owner Related Causes	Delay to provide and deliver the site to the contractor	7	5	3	1	0	0.83	**8**
	Late in revising and approving design documents by owners	5	6	2	2	1	0.75	**12**
	Financing difficulty	5	6	1	3	1	0.737	**13**
	Delay in progress payments for completed works	3	8	2	2	1	0.725	**16**
	Slow in decision making	1	5	6	3	0	0.612	**28**
	Low communication and harmonization	6	4	3	3	0	0.862	**5**
	Scope change and Variation Orders	1	2	7	4	2	0.55	**35**
	Unrealistic contract period	3	6	1	5	2	0.675	**22**
	Suspension of works	1	6	5	3	0	0.625	**26**

Source; Study conducted, 2020

As shown on the table 4.4 according to the client perspective, among the top ten main causes of delay that are considered to be caused by contractor are "Late start & resource mobilization to site" and "Difficulty in project financing (Low financial system)" which have been categorized among the ten main causes of delay.

Table 4. 4Ranked causes of delay from the client perspective to contractor related causes of delay

		5	4	3	2	1	RII	**RANK**
Contractor Related Causes	Low Project management system	6	5	3	1	2	0.812	**10**
	Late start & resource mobilization to site	8	6	2	0	0	0.88	**4**
	Difficulty in project financing (Low financial system)	9	4	2	1	0	0.862	**5**
	Improper construction methodology and Reworks	6	2	6	1	1	0.737	**13**
	Disagreement and conflict with Consultant and client	5	5	3	1	2	0.725	**16**
	Delay in sub-contractors works	7	2	2	3	2	0.712	**18**
	Incompetent project staffing	5	2	1	1	7	0.562	**34**
	Insufficient contractor Experience	5	1	6	2	2	0.662	**24**
	Delay in material endorsement prior to delivery to site	5	6	3	0	3	0.762	**11**

Source; Study conducted, 2020

As shown on the table 4.5 according from the client perspective, there are no causes of delay that are categorized under the top main causes of delay that are considered to be caused by consultant. But “Delay in test and review of works” is considered to be an event causing more delay than the others events that are categorized under the consultant causes

Table 4. 5Ranked causes of delay from the client perspective to consultant related causes of delay

		5	4	3	2	1	RII	RANK
Consultant Related Causes	Inaccurate Site investigation Report	3	2	2	4	5	0.525	**37**
	Delay in issuance of designs and working drawings	3	2	4	7	0	0.613	**27**
	Delay in payments endorsement for completed works	3	5	6	1	1	0.7	**19**
	Delay in test and review of works	3	4	6	2	1	0.675	**22**
	Design errors and complexity of designs	5	0	1	1	9	0.487	**39**
	Lack of qualified supervisors on site	3	2	5	2	4	0.575	**33**
	Low communication with team and other stakeholders	5	2	2	1	6	0.587	**32**
	Lack of detailing in BOQ, designs and specification	2	0	6	2	6	0.475	**40**
	Insufficient experience of consultant	3	1	5	1	6	0.525	**37**

Source; Study conducted, 2020

The table 4.6 shows according from the client perspective, the top main causes of delay that are considered to be caused from resource related and external causes of delay are first “Low quality construction materials” second “Lack of local construction materials in market” third “Machineries distribution problem”, Availability of local materials and sourcing and Price Increase are considered to be the main causes of delay.

Table 4. 6 Ranked causes of delay from the client perspective to resource and external related causes of delay

		5	4	3	2	1	RII	RANK
Resource related Causes (Material, Equipment and Man power)	Availability of skilled and unskilled labor	0	0	1	5	10	0.287	**42**
	Machineries distribution problem	11	3	2	1	0	0.937	**3**
	Availability of local materials and sourcing	2	14	0	0	0	0.82	**9**
	Low productivity of labor	3	3	8	2	0	0.687	**20**
	Low quality construction materials	6	12	0	0	0	0.975	**1**
External causes	Equipment availability on demand	2	1	6	8	0	0.6	**30**
	Lack of availability of imported construction material and goods on market	0	11	3	3	0	0.73	**15**
	Change in regulations and rules by the government	2	8	1	1	4	0.63	**25**
	Price escalation	9	4	1	1	1	0.83	**7**
	Force majeure	6	1	0	1	8	0.55	**35**
	Sudden site condition	4	3	1	5	3	0.6	**30**
	Weather and natural disaster	5	5	0	4	2	0.687	**20**
	Social and cultural causes	1	1	3	5	6	0.425	**41**
	Environmental limitation	1	7	1	6	1	0.612	**28**

So to finalize the top three causes of delay that are caused from the client perspective,

"view lie under client related, contractor related and consultant related causes category respectively". This causes are ranked using the RII value that is calculated.

The first cause of delay with RII 0.975 is Low quality construction materials, Lack of local construction materials in market is the second cause of delay with RII 0.95 and the third cause is because Machineries distribution problem having a RII of 0.937.All the top three causes of delay from the client perspective is under the category of external related causes of delay and resource related cause of delay. Lack of detailing in BOQ, designs and specification, Availability of skilled and unskilled labor and Social and cultural causes or factors having an RII result of 0.475, 0.287and 0.425 respectively are considered to be the lowest three causes of delay which are also categorized under external related causes of delay and resource related cause of delay.

Table 4. 7 Top ten ranked causes of delay from the client perspective

CAUSES OF DELAY	**RII**	**RANK**
Low quality construction materials	0.975	**1**
Lack of local construction materials in market	0.95	**2**
Machineries distribution problem	0.937	**3**
Late start & resource mobilization to site	0.88	**4**
Difficulty in project financing (Low financial system)	0.86	**5**
Low communication and harmonization	0.86	**5**
Price Escalation	0.837	**7**
Delay to provide and deliver the site to the contractor	0.83	**8**
Availability of local materials and sourcing	0.82	**9**
Low Project management system	0.812	**10**

Source; Study conducted, 2020

4.3.2 Causes of delay from the consultant perspective

Out of all the causes of delay the top ten causes of delay which are identified and shown from the consultant perspective. As shown on the table 4.8 according from the consultant perspective, the top causes of delay that are considered to be caused by clients or owners are “Low communication and harmonization” is the only cause

of delay which have been categorized among the ten main causes of delay having RII 0.75

Table 4. 8 Ranked causes of delay from the consultant perspective to client related causes of delay

		5	4	3	2	1	RII	RANK
Client/Owner Related Causes	Delay to provide and deliver the site to the contractor	3	5	6	2	0	0.71	**15**
	Late in revising and approving design documents by owners	7	2	0	4	3	0.675	**18**
	Financing difficulty	9	4	1	1	1	0.837	**6**
	Delay in progress payments for completed works	2	4	2	2	3	0.487	**37**
	Slow in decision making	2	1	8	5	0	0.6	**25**
	Low communication and harmonization	8	0	4	4	0	0.75	**10**
	Scope change and Variation Orders	2	0	8	4	2	0.55	**30**
	Unrealistic contract period	5	0	1	7	3	0.562	**28**
	Suspension of works	5	2	8	1	0	0.738	**11**

Source; Study conducted, 2020

As shown on the table 4.9 according from the consultant perspective, the top causes of delay that are considered to be caused by contractor related causes are “Late start & resource mobilization to site”, “Difficulty in project financing (Low financial system)” and “Low Project management system” which have been categorized among the ten causes of delay having RII value of 0.89, 0.9 and 0.78.

Table 4. 9 Ranked causes of delay from the consultant perspective to contractor related causes of delay

		5	4	3	2	1	RII	RANK
Contractor Related Causes	Low Project management system	10	2	1	1	0	0.78	**8**
	Late start & resource mobilization to site	8	6	2	0	0	0.89	**3**
	Difficulty in project financing (Low financial system)	9	6	1	0	0	0.9	**2**
	Improper construction methodology and Reworks	4	1	9	2	0	0.688	**16**
	Disagreement and conflict with Consultant and client	4	2	4	4	2	0.625	**23**
	Delay in sub-contractors works	2	2	4	4	4	0.525	**35**
	Incompetent project staffing	4	2	2	2	6	0.55	**30**
	Insufficient contractor Experience	2	2	4	6	2	0.55	**30**
	Delay in material endorsement prior to delivery to site	4	0	6	2	4	0.575	**26**

Source; Study conducted, 2020

As shown on the table 4.10according to the consultant perspective, there are no causes of delay that are categorized under the top causes of delay that are considered to be caused by consultant. But “Lack of qualified supervisors on site” is considered to be an event causing more delay than the others events that are categorized under the consultant causes. Having a RII value of 0.675.

Table 4. 10 Ranked causes of delay from the consultant perspective to consultant related causes of delay

		5	4	3	2	1	RII	RANK
Consultant Related Causes	Inaccurate Site investigation Report	2	0	4	4	6	0.45	**39**
	Delay in issuance of designs and working drawings	2	2	4	6	2	0.55	**30**
	Delay in payments endorsement for completed works	2	4	6	4	0	0.65	**21**
	Delay in test and review of works	4	2	6	2	2	0.55	**30**
	Design errors and complexity of designs	4	0	2	2	8	0.475	**38**
	Lack of qualified supervisors on site	2	2	8	6	0	0.675	**18**
	Low communication with team and other stakeholders	4	2	6	2	2	0.65	**21**
	Lack of detailing in BOQ, designs and specification	2	0	4	4	6	0.45	**39**
	Insufficient experience of consultant	2	0	8	2	2	0.5	**36**

Source; Study conducted, 2020

The table 4.11 shows according to the consultant perspective, the top causes of delay that are considered to be caused from resource related and external causes of delay are “Lack of local construction materials in market”, “Sudden site conditions” third “Machineries distribution problem”, Availability of local materials and sourcing and Weather and natural disaster are considered to be the causes of delay. Having RII value of 0.912, 0.85, 0.835 and 0.775 respectively

Table 4. 11Ranked causes of delay from the consultant perspective to resource and external related causes of delay

		5	4	3	2	1	RII	RANK
Resource related Causes (Material, Equipment and Man power)	Availability of skilled and unskilled labor	0	0	2	4	10	0.3	**42**
	Machineries distribution problem	0	3	7	6	0	0.562	**28**
	Availability of local materials and sourcing	3	13	0	0	0	0.835	**7**
	Low productivity of labor	3	3	8	2	0	0.687	**17**
	Low quality construction materials	4	12	0	0	0	0.85	**4**
	Equipment availability on demand	2	1	6	7	0	0.575	**26**
	Lack of local construction materials in market	9	7	0	0	0	0.912	**1**
	Lack of availability of imported construction materials and goods on market	0	11	3	3	0	0.737	**12**
External Causes	Changes in Regulations and Rules by government	4	8	0	2	2	0.725	**13**
	Price Escalation	6	4	2	2	2	0.725	**13**
	Force majeure (War, Conflict, Riot and violence)	8	2	0	0	6	0.675	**18**
	Sudden site conditions	4	8	4	2	0	0.85	**4**
	Weather and natural disaster (act of God)	4	8	2	2	0	0.775	**9**
	Social and cultural causes	0	2	8	2	4	0.45	**39**
	Environmental limitation	0	8	2	6	0	0.625	**23**

Source; Study conducted, 2020

So to finalize the top three causes of delay that are caused from the Consultant perspective, “view lie under client related, contractor related and consultant related causes category respectively”. This causes are ranked using the RII value that is calculated.

The first cause of delay with RII 0.912 is Lack of local construction materials in market, Difficulty in project financing is the second cause of delay with RII 0.9and the third cause is because Late start & resource mobilization to site having a RII of 0.89.The first cause of delay from the consultant perspective is under the category of resource related cause of delay. The other events ranked on the second and third are categorized under the contractor related causes of delay. Availability of skilled and unskilled labor, Inaccurate Site investigation Report and Social and cultural factors or causes having an RII result of 0.3, 0.45and 0.45 respectively are considered to be the lowest three causes of delay.

Table 4. 12 Top ten causes of delay from the consultant perspective

CAUSES OF DELAY	**RII**	**RANK**
Lack of local construction materials in market	0.912	**1**
Difficulty in project financing (Low financial system)	0.9	**2**
Late start & resource mobilization to site	0.89	**3**
Low quality construction materials	0.85	**4**
Sudden site conditions	0.85	**4**
Financing difficulty	0.837	**6**
Availability of local materials and sourcing	0.835	**7**
Low Project management system	0.78	**8**
Weather and natural disaster	0.775	**9**
Low communication and harmonization	0.75	**10**

Source; Study conducted, 2020

4.3.3 Causes of delay from the contractor perspective

As shown on the table 4.13 according from the contractor perspective, the top causes of delay that are considered to be caused by clients or owners related are “Delay in

progress payments for completed works" having RII value of 0.84, Unrealistic contract period and Suspension of work having RII rank of 0.68 are also causes of delay that are categorized among the ten causes of delay.

Table 4. 13Ranked causes of delay from the contractor perspective to client related causes of delay

		5	**4**	**3**	**2**	**1**	**RII**	**RANK**
Client/Owner Related Causes	Delay to provide and deliver the site to the contractor	6	9	0	0	0	0.32	**30**
	Late in revising and approving design documents by owners	6	3	6	0	0	0.4	**22**
	Financing difficulty	6	3	0	0	6	0.56	**14**
	Delay in progress payments for completed works	2	0	0	4	9	0.84	**6**
	Slow in decision making	6	1	0	8	0	0.53	**15**
	Low communication and harmonization	7	4	4	0	0	0.36	**26**
	Scope change and Variation Orders	8	3	4	0	0	0.346	**27**
	Unrealistic contract period	5	0	2	0	8	0.68	**8**
	Suspension of works	2	3	0	7	3	0.68	**8**

Source; Study conducted, 2020

As shown on the table 4.14 according to the contractor perspective, there are no causes of delay that are related to the contractor causes that are among the top causes.

Table 4. 14 Ranked causes of delay from the contractor perspective to contractor related causes of delay

		1	2	3	4	5	RII	**RANK**
Contractor Related Causes	Low Project management system	6	2	0	3	0	0.29	**34**
	Late start & resource mobilization to site	5	3	0	0	7	0.61	**11**
	Difficulty in project financing(Low financial system)	3	4	0	8	0	0.57	**13**
	Improper construction methodology and Reworks	9	3	3	0	0	0.32	**30**
	Disagreement and conflict with Consultant and client	4	4	5	2	0	0.46	**18**
	Delay in sub-contractors works	3	6	3	0	3	0.52	**16**
	Incompetent project staffing	6	9	0	0	0	0.32	**30**
	Insufficient contractor Experience	15	0	0	0	0	0.2	**40**
	Delay in material endorsement prior to delivery to site	3	11	0	1	0	0.38	**24**

Source; Study conducted, 2020

As shown on the table 4.15 according to the consultant perspective, “Delay in test and review of works” is considered to be an event that can be caused because of consultant related causes of delay having RII value of 0.62.

Table 4. 15Ranked causes of delay from the contractor perspective to consultant related causes of delay

		1	2	3	4	5	RII	**RANK**
Consultant Related causes	Inaccurate Site investigation Report	10	0	5	0	0	0.33	**28**
	Delay in issuance of designs and working drawings	3	10	0	2	0	0.413	**21**
	Delay in payments endorsement for completed works	1	0	11	3	0	0.61	**11**
	Delay in test and review of works	6	0	2	0	7	0.62	**10**
	Design errors and complexity of designs	12	3	0	0	0	0.24	**38**
	Lack of qualified supervisors on site	12	3	0	0	0	0.25	**36**
	Low communication with team and other stakeholders	3	6	6	0	0	0.44	**20**
	Lack of detailing in BOQ ,designs and specification	4	7	0	4	0	0.453	**19**
	Insufficient experience of consultant	15	0	0	0	0	0.2	**40**

Source; Study conducted, 2020

The table 4.16 shows according to the contractor perspective, the top ten main causes of delay that are considered to be caused from resource related and external causes of delay are “lack of availability of imported construction materials and goods on market “and “Equipment availability on demand “‘ with a RII value of 0.98. Lack of local construction materials in market is also another event that is cause delay having RII value of 0.97. Availability of local materials and sourcing have a RII value of 0.94, Low quality construction materials have RII value of 0.9. Machineries distribution problem have RII value of 0.73.

Table 4. 16 Ranked causes of delay from the contractor perspective to resource and external related causes of delay

		1	2	3	4	5	RII	**RANK**
Resource related Causes (Material, Equipment and Man power)	Availability of skilled and unskilled labor	9	6	0	0	0	0.28	**35**
	Machineries distribution problem	0	0	7	6	2	0.73	**7**
	Availability of local materials and sourcing	0	0	0	4	11	0.94	**4**
	Low productivity of labor	3	3	8	1	0	0.49	**17**
	Low quality construction material	0	0	0	7	8	0.9	**5**
	Equipment availability on demand	0	0	0	1	14	0.98	**1**
	Lack of local construction materials in market	0	0	0	2	13	0.97	**3**
	Lack of availability of imported construction materials and goods on market	0	0	0	1	14	0.98	**1**
External Causes	Changes in Regulations and Rules by government	8	5	2	0	0	0.32	**30**
	Price Escalation	13	0	2	0	0	0.25	**36**
	Force majeure (War, Conflict, Riot and violence)	15	0	0	0	0	0.2	**40**
	Sudden site conditions	8	0	7	0	0	0.38	**24**
	Weather and natural disaster (act of God)	10	0	5	0	0	0.33	**28**
	Social and cultural causes	12	3	0	0	0	0.24	**38**
	Environmental limitation	4	7	4	0	0	0.4	**22**

Source; Study conducted, 2020

So, to finalize the top three causes of delay that are caused from the contractor perspective, “view lie under client related, contractor related and consultant related causes category respectively”. This causes are ranked using the RII value that is calculated.

The table above show list of causes of delay that are ranked according to the RII value. As it demonstrates that the top three causes of delay based on the importance priority from consultants‟ view lie under contractor related, client related and consultant related causes category respectively. This causes are ‘Equipment availability on demand’ and ‘Lack of availability of imported construction materials and goods on market” these two causes are ranked at first place with RII value of 0.98. Which are categorized under resource related causes. Third place is Lack of local construction materials in market with RII value of 0.97. The bottom three causes to have less contribution in influencing the time overrun are considered as Force majeure (War, Conflict, Riot and violence), Insufficient contractor Experience, Social and cultural causes with 0.2,0.2 and 0.24 RII value respectively.

Table 4. 17 top ten causes of delay from the contractor perspective

CAUSES OF DELAY	**RII**	**RANK**
Lack of availability of imported construction materials and goods on market	0.98	**1**
Equipment availability on demand	0.98	**1**
Lack of local construction materials in market	0.97	**3**
Availability of local materials and sourcing	0.94	**4**
Low quality construction materials	0.9	**5**
Delay in progress payments for completed works	0.84	**6**
Machineries distribution problem	0.73	**7**
Suspension of works	0.68	**8**
Unrealistic contract period	0.68	**8**
Low communication and harmonization	0.75	**10**

Source; Study conducted, 2020

4.3.4 Causes of delay from the consultant, contractor and client perspective –combined perspective

The table 4.18 shows the combined views, to the owner or client related category. Among the top ten causes of delay that are caused by the owner "suspension of work" is ranked number seven having RII value of 0.77,while "Delay in progress payments for completed works" is ranked number nine having RII of 0.68 and Financing problem is ranked number ten having RII

Table 4. 18 Ranked causes of delay from the combined perspective to client related causes of delay

		W	RII	RANK
Client/Owner Related Causes	Delay to provide and deliver the site to the contractor	148	0.62979	16
	Late in revising and approving design documents by owners	140	0.59574	23
	Financing difficulty	159	0.6766	10
	Delay in progress payments for completed works	160	0.68085	9
	Slow in decision making	137	0.58298	26
	Low communication and harmonization	156	0.66383	11
	Scope change and Variation Orders	114	0.48511	33
	Unrealistic contract period	150	0.6383	14
	Suspension of works	181	0.77021	7

Source; Study conducted, 2020

The table 4.19 shows the combined views, to contractor related category. Among the top ten causes of delay that are caused by the contractor “Late start and resource mobilization to site” is ranked number five having RII value of 0.795,while “Difficulty in project financing(Low financial system) ” is ranked number six having RII of 0.787.

Table 4. 19 Ranked causes of delay from the combined perspective to contractor related causes of delay

		W	RII	RANK
Contractor Related Causes	Low Project management system	150	0.6383	14
	Late start & resource mobilization to site	187	0.79574	5
	Difficulty in project financing(Low financial system)	185	0.78723	6
	Improper construction methodology and Reworks	138	0.58723	24
	Disagreement and conflict with Consultant and client	143	0.60851	20
	Delay in sub-contractors works	138	0.58723	24
	Incompetent project staffing	113	0.48085	34
	Insufficient contractor Experience	112	0.4766	36
	Delay in material endorsement prior to delivery to site	136	0.57872	27

Source; Study conducted, 2020

The table 4.20 shows the combined views, to consultant related category. As shown in the table none of this events are categorized under the top ten causes of delay.

Table 4. 20 Ranked causes of delay from the combined perspective to consultant related causes of delay

		W	RII	RANK
Consultant Related Causes	Inaccurate Site investigation Report	103	0.4383	38
	Delay in issuance of designs and working drawings	124	0.52766	31
	Delay in payments endorsement for completed works	154	0.6553	13
	Delay in test and review of works	145	0.61702	17
	Design errors and complexity of designs	95	0.40426	40
	Lack of qualified supervisors on site	118	0.50213	32
	Low communication with team and other stakeholders	132	0.5617	29
	Lack of detailing in BOQ ,designs and specification	108	0.45957	37
	Insufficient experience of consultant	97	0.41277	39

Source; Study conducted, 2020

The table 4.21 shows the combined views, to resource and external causes of delay, Lack of local construction materials in market is ranked number one with RII value of 0.978, Low quality construction materials is ranked number two with RII value of 0.953, Availability of local materials and sourcing is ranked number three with RII value of 0.846, Machineries distribution problem is ranked number four with RII value of 0.829 and Lack of availability of imported construction materials and goods on market is ranked number eight with RII value of 0.753 .

Table 4. 21Ranked causes of delay from the combined perspective to resource and Material related causes of delay

		W	RII	RANK
Resource related Causes (Material, Equipment and Man power)	Availability of skilled and unskilled labor	68	0.28936	42
	Machineries distribution problem	195	0.82979	4
	Availability of local materials and sourcing	199	0.84681	3
	Low productivity of labor	155	0.65957	12
	Low quality construction materials	224	0.95319	2
	Equipment availability on demand	141	0.6	22
	Lack of local construction materials in market	230	0.97872	1
	Lack of availability of imported construction materials and goods on market	177	0.75319	8
External Causes	Changes in Regulations and Rules by government	133	0.56596	28
	Price Escalation	144	0.61277	19
	Force majeure (War, Conflict, Riot and violence)	113	0.48085	34
	Sudden site conditions	145	0.61702	17
	Weather and natural disaster (act of God)	142	0.60426	21
	Social and cultural causes	88	0.37447	41
	Environmental limitation	129	0.54894	30

Source; Study conducted, 2020

To finalize from the combined view of respondents the following are the top five causes of delay that are lack of local construction materials in market is ranked number one with RII value of 0.978, Low quality construction materials is ranked number two with RII value of 0.953, Availability of local materials and sourcing is ranked number three with RII value of 0.846, Machineries distribution problem is ranked number four with RII value of 0.829 and "Late start and resource mobilization to site" is ranked number five having RII value of 0.795.The results from the interview also state the same causes. As stated by the contractor(technical manager) from the interview conducted , the main reasons why delay is caused is because of the low quality of the machineries used to do the work and there is also a lack of local materials in the country, and less availability of local materials and sourcing .This materials that are not available on the local market take a longer time to import them , materials like tension power From the interview conducted with the consultant and client (project manager), the answer was also the same as the contractor. The cause for delay is because of machines being down, it was also stated that TL foundation takes more time on maintenance of the machine. It basically shows that most of the major causes of delay is caused because of resource related causes of delay, especially machine related. The quality of the material and also spare parts not being available when needed have been the main difficulties that they have been facing.

The table4.22 shows the top ten causes of delay from the combined perspective. The top four causes of delay are categorized under the cause of Resource related Causes (Material, Equipment and Man power) and the 5th cause is because of the contractor. The less important delay events that had an effect are Social and cultural causes (RII 0.374) ranked number 41, Availability of skilled and unskilled labor (RII 0.289) ranked number 42. Design errors and complexity of designs (RII 0.4) ranked 40.

Table 4. 22Top ten causes of delay from the combined perspective

CAUSES OF DELAY	**RII**	**RANK**	**categories**
Lack of local construction materials in market	0.978	**1**	**Resources related**
Low quality construction materials	0.953	**2**	**Resources related**
Availability of local materials and sourcing	0.84	**3**	**Resources related**
Machineries distribution problem	0.82	**4**	**Resources related**
Late start & resource mobilization to site	0.79574	**5**	**Contractor related**
Difficulty in project financing(Low financial system)	0.78723	**6**	**Contractor related**
Suspension of works	0.77	**7**	**Owner related**
Lack of availability of imported construction materials and goods on market	0.75	**8**	**Resource related**
Delay in progress payments for completed works	0.68085	**9**	**Owner related**
Financing difficulty	0.675	**10**	**Owner related**

Source; Study conducted, 2020

Table 4. 23Ranked Combined perspective only for the owner or client related causes

		W	RII	RANK
Client/Owner Related Causes	Delay to provide and deliver the site to the contractor	148	0.62979	6
	Late in revising and approving design documents by owners	140	0.59574	7
	Financing difficulty	159	0.6766	3
	Delay in progress payments for	160	0.68085	2
	completed works			
	Slow in decision making	137	0.58298	8
	Low communication and harmonization	156	0.66383	4
	Scope change and Variation Orders	114	0.48511	9
	Unrealistic contract period	150	0.6383	5
	Suspension of works	181	0.77021	1

Source; Study conducted, 2020

Table 4. 24 Ranked Combined perspective only for the contractor related causes

		W	RII	RANK
Contractor Related Causes	Low Project management system	150	0.6383	3
	Late start & resource mobilization to site	187	0.79574	1
	Difficulty in project financing(Low financial system)	185	0.78723	2
	Improper construction methodology and Reworks	138	0.58723	5.5
	Disagreement and conflict with Consultant and client	143	0.60851	4
	Delay in sub-contractors works	138	0.58723	5.5
	Incompetent project staffing	113	0.48085	8
	Insufficient contractor Experience	112	0.4766	9
	Delay in material endorsement prior to delivery to site	136	0.57872	7

Source; Study conducted, 2020

Table 4. 25 Ranked combined perspective for consultant related causes of delay

		W	RII	RANK
Consultant Related Causes	Inaccurate Site investigation Report	103	0.4383	7
	Delay in issuance of designs and working drawings	124	0.52766	4
	Delay in payments endorsement for completed works	154	0.65532	1
	Delay in test and review of works	145	0.61702	2
	Design errors and complexity of designs	95	0.40426	9
	Lack of qualified supervisors on site	118	0.50213	5
	Low communication with team and other stakeholders	132	0.5617	3
	Lack of detailing in BOQ ,designs and specification	108	0.45957	6
	Insufficient experience of consultant	97	0.41277	8

Source; Study conducted, 2020

Table 4. 26 Ranked combined perspective for resource and external related causes

		W	RII	RANK
Resource related Causes (Material, Equipment and Man power)	Availability of skilled and unskilled labor	68	0.28936	15
	Machineries distribution problem	195	0.82979	4
	Availability of local materials and sourcing	199	0.84681	3
	Low productivity of labor	155	0.65957	6
	Low quality construction material	224	0.95319	2
	Equipment availability on demand	141	0.6	10
	Lack of local construction material in market	230	0.97872	1
	Lack of availability of imported construction material and goods on market	177	0.75319	5
External causes	Change in regulation and rules by government	133	0.56596	11
	Price escalation	144	0.6127	8
	Force majeure	113	0.48085	13
	Sudden site condition	145	0.61702	7
	Weather and natural disaster	142	0.60426	9
	Social and cultural causes	88	0.37447	14
	Environmental limitation	129	0.54894	12

Source; Study conducted, 2020

CHAPTER FIVE: CONCLUSION AND RECOMENDATION

This chapter of the study finalizes the findings concluded while assessing the causes of delay on the ongoing projects of the TL foundation specialist.

5.1 Conclusion

As the study set out to address the causes of delay on the construction projects in the case of TL foundation specialist. Response from questionnaire and interview is used in order to reach to conclusion and recommendation. On the fourth chapter the study was able to identify the causes of delay. This study also identified the causes of delay from the perspective of the client, contractor, and consultant and combined perspective in the case of TL foundation specialist. All the objectives of the study are fully meet as shown on the data analysis part which is chapter four and summarized below.

From the owner or the client perspective the top five ranked causes of delay are: Low quality construction materials, Lack of local construction materials in market, Machineries distribution problem, Late start & resource mobilization to site and Difficulty in project financing (Low financial system) respectively.

From the consultant perspective the top five causes of delay are: Lack of local construction materials in market, Difficulty in project financing (Low financial system), late start & resource mobilization to site, Low quality construction materials and sudden site conditions respectively.

From the contractor perspective the top five causes of delay are; Lack of availability of imported construction materials and goods on market, Equipment availability on demand, Lack of local construction materials in market, Availability of local materials and sourcing and Low quality construction materials respectively.

From the combined or from the client, consultant and contractor perspective the most significant ten cause of delay that is specifically for the ongoing projects of TL foundation specialist. Lack of local construction materials in market, Low quality

construction materials, availability of local materials and sourcing,Machineries distribution problem and Late start and resource mobilization to site.

Given the above finding of the study and given the literature review, main causes of delay are because of the contractor having lack of proper resource management or causes of delay under the category of resource related cause. For the projects of the TL foundation specialist it is causing a critical delay that have an effect on the overall construction project which leads to an addition of money and time to the estimated or planned scope. The causes of delay on the projects of TL foundation specialist is categorized under excusable compensable delay where the sub-contractor and contractor are selected in order to make compensation to the time overrun that occurred which can be additional time and compensation for that matter.

5.2 Recommendation

Depending on the findings of the paper this section of the study provides on how to minimize or mitigate delay to construction projects that the TL foundation specialist that are currently active and also for future projects.

For contractors:

Contractors should be able to have a detailed and a reliable planning of the projects that they execute, they should develop risk management plan as well considering both opportunities and threats .In order to do that a project manager with a know how about the field should be hired. Project resource (machineries) management should be given more emphasis since that has been causing delay for the TL foundation specialist. Detailed planning, executing, monitoring and controlling is expected to overcome this obstacle

-All construction materials used for the execution of project should be imported and should be considered under resource management before execution of projects.

- Contracts should be able to use materials that have better quality. They should not only focus on the low cost of the machineries that they purchase but rather focus on the quality of the machine, if not they will spend their time on maintenance of this materials which leads to time over run and additional cost as well.

- The contractor should be able to solve the problems related to machinery distribution. Since contractors could be doing more than one project at a time, resource management plan should be developed.

-Work should be done according to schedule, resources should be mobilized and should start commencement of works immediately after possession of site.

- Contractors should develop financial plans and better cash flow management system. Skilled or professional personals should be able to develop the financial plan.

- Contractors should develop risk management plan and works should be done in parallel in order to decrease the Suspension of works caused from the client position.

For clients or Owners:

Clients should collaborate with the different stakeholders involved .They should cooperate to follow the plans of the contractor, having a person with the understanding of the construction industry from the clients side can help them to involve and contribute to the project rather than just handing over the work to the other stakeholders.

-Clients should be able to make payment for the work done according to the contract they agreed on.

-Clients should make all the payment according to the contract and should be ready for all financial related expenses expected to run the project.

-Clients should have to create a great bond in communication and coordination within them self's, the contractor and the consultant.

-Clients should be able to manage and keep the work going. Should be able to perform their role on time in order to avoid suspension of work.

-Clients should provide and deliver the site to the contractor on time in order to avoid

For consultants:

The consultant must appoint an experienced and qualified designer that could coordinate and communicate with project design team and other project stakeholder especially the client's to make sure that project objectives are very clear and can be achieved as per the client requirements. Full awareness of designer who deals directly with the client should be familiar with project objective and future development to manage and control the

required changes and modifications of client during design development phase and during executions as well.

- Consultants should be able to provide a well-organized design and working drawings for the contractor

-Consultants should have a good know how on detailing BOQ, design, specification and also should have a clear understanding of the site condition where the project will take place.

-consultants should avoid delay in test, inspection of work and also delay in payment approval for works that are completed.

5.2.1 Recommendation for further studies

Researches must be done on foundation (pilling and shoring service) part of the construction. Having research done on this specific area can help other researchers as a guideline. These researches should be conducted on different parts of Ethiopia which can help to add on the validity and reliability of the data.

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Appendix

Appendix 1 questionnaire

Questionnaire

Dear Respondent

I am currently working on my research paper entitled "Assessment on the causes of construction project delay in the cast of TL foundation specialist" in Addis Ababa for the partial fulfillment of the requirements for the degree of Master of Art in Project Management at Addis Ababa University, School of Commerce. The main aim of the research is to assess delay causes in the case of TL Foundation specialist. So, this questionnaire is only to collect information or data regarding the objective of the research

I generously request you answer the questions honestly from your experience and understanding of the situation. The questionnaire is organized of two main section, the first section includes questions related to general information of the respondent. The second section include questions that help to identify the causes of delay form the stakeholder's perspective.

I kindly ask you to answer the questions as accurately as possible so that the data can be reliable. This study is only used for the case of academic purposes and confidentiality of your response is highly guaranteed.

Looking forward to your response,

With Regards,

Bezawit Sebsebie

Advisor: - Dr. ABDURAZAK.M

If there is anything that is not clear or needs clarification on the questionnaire, please contact me on Tel:-09-20-71-65-21 or E-mail:-niinuseb@gmail.com

SECTION A – General Information

1. Organization type

Owner/ client — Contractor —— Consultant

2. Gender

Male —— Female

3. Job Status/Title

Project Manager —Construction/Office head — Quantity Surveyor /Site Engineer —— Site inspector

Resident Engineer— Office Engineer Project Coordinator — Contract Admin.

Other

4. Current Educational level

Advanced Level —— Bachelor —— Masters —— PhD
Other

5. Experience in Construction Industry

0-3 years 3-5 years 5-10 years above 10 years
—

Please indicate the significance rate of each factor by ticking the appropriate box. Add any remark if any relating to each factor on the last column.

5 = extremely important 4 = very important 3= moderately important 2 = slightly important 1 = not important

Ser.	**Causes of Delay**	**Importance**					**Remark**
No.		**5**	**4**	**3**	**2**	**1**	
i	**Client/Owner Related Causes**						
1	Delay to provide and deliver the site to the contractor						
2	Late in revising and approving design documents by owners						
3	Financing difficulty						
4	Delay in progress payments for completed works						
5	Taking time to making decision						
6	Low communication and harmonization						
7	Scope change and Variation Orders						
8	Unrealistic contract period						
9	Suspension of works						
ii	**Contractor Related Causes**						
10	Low Project management system						

11	Late start & resource mobilization to site						
12	Difficulty in project financing(Low financial system)						
13	Improper construction methodology and Reworks						
14	Disagreement and conflict with Consultant and Client						

Ser. No.	**Causes of Delay**	**Importance**					**Remark**
		5	**4**	**3**	**2**	**1**	
15	Delay in sub-contractors works						
16	Incompetent project staffing						
17	Insufficient contractor Experience						
18	Delay in material endorsement prior to delivery to site						
iii	**Consultant Related Causes**						
19	Inaccurate Site investigation Report						
20	Delay in issuance of designs and working drawings						
21	Delay in payments endorsement for completed works						
22	Delay in test and review of works						
23	Design errors and complexity of designs						
24	Lack of qualified supervisors on site						

25	Low communication with team and other stakeholders						
26	Lack of detailing in BOQ ,designs and specification						
27	Insufficient experience of consultant						
iv	**Resource related Causes (Material, Equipment and Man power)**						
28	Availability of skilled and unskilled labor						
29	Machineries distribution problem						
Ser.	**Causes of Delay**	**Importance**					**Remark**
No.		**5**	**4**	**3**	**2**	**1**	
30	Availability of local materials and sourcing						
31	Low productivity of labor						
32	Low quality construction materials						
33	Equipment availability on demand						
34	Lack of local construction materials in market						
35	Lack of availability of imported construction materials and goods on market						
v	**External Causes**						
36	Changes in Regulations and Rules by government						

37	Price Escalation						
38	Force majeure (War, Conflict, Riot and violence)						
39	Sudden site conditions						
40	Weather and natural disaster (act of God)						
41	Social and cultural causes						
42	Environmental limitation						

5 = extremely important, 4 = very important, 3 = moderately important , 2 = slightly important ,1 = not important

Appendix 2 Interview

Interview

Dear Respondent

I am currently working on my research paper entitled Assessment on the causes of construction project delay in the cast of TL foundation specialist in Addis Ababa for the partial fulfillment of the requirements for the degree of Master of Art in Project Management at Addis Ababa University, School of Commerce. The main aim of the research is to assess delay in the case of TL Foundation specialist. So, this interview is only to collect information or data regarding the objective of the research

Background Information about interviewee

1. What is your education level?
2. What is your position in the organization? ----------
3. What is your work experience in Building Construction? ----------
4. Have you experienced delay?

5, what do you think are the main delay causing factors from your perspective regarding to the projects of TL foundation specialist?

6. What do you believe are the ways to mitigate delay?

Ser. No.	**Causes of Delay**	**Importance**					**Remark**
		5	**4**	**3**	**2**	**1**	
i	**Client/Owner Related Causes**						
1	Delay to provide and deliver the site to the contractor						
2	Late in revising and approving design documents by owners						
3	Financing difficulty						
4	Delay in progress payments for completed works						
5	Taking time to making decision						
6	Low communication and harmonization						
7	Scope change and Variation Orders						
8	Unrealistic contract period						
9	Suspension of works						
ii	**Contractor Related Causes**						
10	Low Project management system						
11	Late start & resource mobilization to site						

12	Difficulty in project financing(Low financial system)						
13	Improper construction methodology and Reworks						
14	Disagreement and conflict with Consultant and Client						

Ser. No.	**Causes of Delay**	**Importance**					**Remark**
		5	**4**	**3**	**2**	**1**	
15	Delay in sub-contractors works						
16	Incompetent project staffing						
17	Insufficient contractor Experience						
18	Delay in material endorsement prior to delivery to site						
iii	**Consultant Related Causes**						
19	Inaccurate Site investigation Report						
20	Delay in issuance of designs and working drawings						
21	Delay in payments endorsement for completed works						
22	Delay in test and review of works						
23	Design errors and complexity of designs						
24	Lack of qualified supervisors on site						

25	Low communication with team and other stakeholders						
26	Lack of detailing in BOQ ,designs and specification						
27	Insufficient experience of consultant						
iv	**Resource related Causes (Material, Equipment and Man power)**						
28	Availability of skilled and unskilled labor						
29	Machineries distribution problem						
30	Availability of local materials and sourcing						
31	Low productivity of labor						
32	Low quality construction materials						
33	Equipment availability on demand						
34	Lack of local construction materials in market						
35	Lack of availability of imported construction materials and goods on market						
v	**External Causes**						
36	Changes in Regulations and Rules by government						
37	Price Escalation						
38	Force majeure (War, Conflict, Riot and violence)						

39	Sudden site conditions						
40	Weather and natural disaster (act of God)						
41	Social and cultural causes						
42	Environmental limitation						

5 = extremely important, 4 = very important, 3 = moderately important , 2 = slightly important ,1 = not important

Appendix 3 projects that have faced delay in the TL foundation specialist

Project Name	Project	Agreed completion time of project	Should have been completed at	Actually completed at
W/ro Letekidan Tekie's Apartment Building (2B+G_9)Apartment building	Shoring Excavation and Earthwork	45 calendar days +15commencment day(starting from December 6,2018)	January 29,2019	March 5,2020
Yegemiya Trade Sc. Mixed use building	Excavation Protection installation	139 working days+ 15 days for mobilization(starting from February 10)	July 14, 2019	November 13,2019
Oromia Cultural center and building	Excavation Protection installation	65 working days+15 days for mobilization(starting from July 24,2019)	October 12,2019	November 21,2019
Gift real estate PVT .LTDD.G (on going)	Excavation Protection	78 working day+15 mobilization (March	June 29,2019	Still not completed

	installation	28,2019)		

Appendix 4 Respondents row data

		contractor view					consultant View					Client View				
		1	2	3	4	5	5	4	3	2	1	5	4	3	2	1
Client/Owner Related Causes	Delay to furnish and deliver the site to the contractor	6	9	0	0	0	3	5	6	2	0	7	5	3	1	0
	Late in revising and approving design documents by own	6	3	6	0	0	7	2	0	4	3	5	6	2	2	1
	Financing problems	6	3	0	0	6	9	4	1	1	1	5	6	1	3	1
	Delay in progress payments for completed works	2	0	0	4	9	2	4	2	2	3	3	8	2	2	1
	Slow in decision making	6	1	0	8	0	2	1	8	5	0	1	5	6	3	0
	Poor communication and coordination	7	4	4	0	0	8	0	4	4	0	6	4	3	3	0
	Scope change and Variation Orders	8	3	4	0	0	2	0	8	4	2	1	2	7	4	2
	Unrealistic contract period	5	0	2	0	8	5	0	1	7	3	3	6	1	5	2
	Suspension of works	2	3	0	7	3	5	2	8	1	0	1	6	5	3	0
Contractor Related Causes	Poor Project management system	6	2	0	3	0	10	2	1	1	0	6	5	3	1	2
	Late start & resource mobilization to site	5	3	0	0	7	8	6	2	0	0	8	6	2	0	0
	Difficulty in project financing(poor financial system)	3	4	0	8	0	9	6	1	0	0	9	4	2	1	0
	Improper construction methodology and Reworks	9	3	3	0	0	4	1	9	2	0	6	2	6	1	1
	Disagreement and conflict with Consultant and client	4	4	5	2	0	4	2	4	4	2	5	5	3	1	2
	Delay in sub-contractors works	3	6	3	0	3	2	2	4	4	4	7	2	2	3	2
	Incompetent project staffing	6	9	0	0	0	4	2	2	2	6	5	2	1	1	7
	Inadequate contractor Experience	15	0	0	0	0	2	2	4	6	2	5	1	6	2	2
	Delay in material approval prior to delivery to site	3	11	0	1	0	4	0	6	2	4	5	6	3	0	3
Consultant Related Causes	Inaccurate Site investigation Report	10	0	5	0	0	2	0	4	4	6	3	2	2	4	5
	Delay in issuance of designs and working drawings	3	10	0	2	0	2	2	4	6	2	3	2	4	7	0
	Delay in payments approval for completed works	1	0	11	3	0	2	4	6	4	0	3	5	6	1	1
	Delay in test and inspection of works	6	0	2	0	7	4	2	6	2	2	3	4	6	2	1
	Design errors and complexity of designs	12	3	0	0	0	4	0	2	2	8	5	0	1	1	9
	Lack of qualified supervisors on site	12	3	0	0	0	2	2	8	6	0	3	2	5	2	4
	Poor communication with team and other stakholder	3	6	6	0	0	4	2	6	2	2	5	2	2	1	6
	Lack of detailing in BOQ ,designs and sppecificatio	4	7	0	4	0	2	0	4	4	6	2	0	6	2	6
	Inadequate experience of consultant	15	0	0	0	0	2	0	8	2	2	3	1	5	1	6
Resource related Causes	Availability of skilled and unskilled labor	9	6	0	0	0	0	0	2	4	10	0	0	1	5	10
	Machineries allocation problem	0	0	7	6	2	0	3	7	6	0	11	3	2	1	0
	Availability of local materials and sourcing	0	0	0	4	11	3	13	0	0	0	2	14	0	0	0
	Low productivity of labor	3	3	8	1	0	3	3	8	2	0	3	3	8	2	0
	Poor quality construction materials	0	0	0	7	8	4	12	0	0	0	6	12	0	0	0
	Equipment availability on demand	0	0	0	1	14	2	1	6	7	0	2	1	6	8	0
	Shortage of local construction materials in market	0	0	0	2	13	9	7	0	0	0	11	3	3	0	0
	Shortage of availability of imported construction materials and goo	0	0	0	1	14	0	11	3	3	0	0	11	3	3	0
External Causes	Changes in Regulations and Rules by government	8	5	2	0	0	4	8	0	2	2	2	8	1	1	4
	Price Inflation	13	0	2	0	0	6	4	2	2	2	9	4	1	1	1
	Force majeure (War, Conflict, Riot and violence)	15	0	0	0	0	8	2	0	0	6	6	1	0	1	8
	Unforeseen site conditions	8	0	7	0	0	4	8	4	2	0	4	3	1	5	3
	Weather and natural disaster (act of God)	10	0	5	0	0	4	8	2	2	0	5	5	0	4	2
	Social and cultural factors	12	3	0	0	0	0	2	8	2	4	1	1	3	5	6
	Environmental restrictions	4	7	4	0	0	0	8	2	6	0	1	7	1	6	1

Appendix 5 Causes of Delay from the contractor perspective

Contract Perspective								
		Contractor					Contractor	
		1	2	3	4	5	RII	RANK
Client/Owner Related Causes	Delay to provide and deliver the site to the contractor	6	9	0	0	0	0.32	**33**
	Late in revising and approving design documents by owners	6	3	6	0	0	0.4	**26**
	Financing difficulty	6	3	0	0	6	0.56	**17**
	Delay in progress payments for completed works	2	0	0	4	9	0.84	**6**
	Slow in decision making	6	1	0	8	0	0.53	**18**
	Low communication and harmonization	7	4	4	0	0	0.36	**30**
	Scope change and Variation Orders	8	3	4	0	0	0.346	**31**
	Unrealistic contract period	5	0	2	0	8	0.68	**9**
	Suspension of works	2	3	0	7	3	0.68	**9**
Contractor Related Causes	Low Project management system	6	2	0	3	0	0.29	**37**
	Late start & resource mobilization to site	5	3	0	0	7	0.61	**13**
	Difficulty in project financing(Low financial system)	3	4	0	8	0	0.57	**16**
	Improper construction methodology and Reworks	9	3	3	0	0	0.32	**33**
	Disagreement and conflict with Consultant and client	4	4	5	2	0	0.46	**25**
	Delay in sub-contractors works	3	6	3	0	3	0.52	**21**
	Incompetent project staffing	6	9	0	0	0	0.32	**33**
	Insufficient contractor Experience	15	0	0	0	0	0.2	**41**
	Delay in material endorsement prior to delivery to site	3	11	0	1	0	0.38	**28**
Consultant Related Causes	Inaccurate Site investigation Report	10	0	5	0	0	0.525	**19**
	Delay in issuance of designs and working drawings	3	10	0	2	0	0.612	**12**
	Delay in payments endorsement for completed works	1	0	11	3	0	0.7	**8**

	Delay in test and review of works	6	0	2	0	7	0.675	**11**
	Design errors and complexity of designs	12	3	0	0	0	0.487	**23**
	Lack of qualified supervisors on site	12	3	0	0	0	0.575	**15**
	Low communication with team and other stakeholders	3	6	6	0	0	0.587	**14**
	Lack of detailing in BOQ ,designs and specification	4	7	0	4	0	0.475	**24**
	Insufficient experience of consultant	15	0	0	0	0	0.525	**19**
Resource related Causes (Material, Equipment and Man power)	Availability of skilled and unskilled labor	9	6	0	0	0	0.28	**38**
	Machineries distribution problem	0	0	7	6	2	0.73	**7**
	Availability of local materials and sourcing	0	0	0	4	11	0.94	**4**
	Low productivity of labor	3	3	8	1	0	0.49	**22**
	Low quality construction materials	0	0	0	7	8	0.9	**5**
	Equipment availability on demand	0	0	0	1	14	0.98	**1**
	Lack of local construction materials in market	0	0	0	2	13	0.97	**3**
	Lack of availability of imported construction materials and goods on market	0	0	0	1	14	0.98	**1**
External Causes	Changes in Regulations and Rules by government	8	5	2	0	0	0.32	**33**
	Price Escalation	13	0	2	0	0	0.25	**39**
	Force majeure (War, Conflict, Riot and violence)	15	0	0	0	0	0.2	**41**
	Sudden site conditions	8	0	7	0	0	0.38	**28**
	Weather and natural disaster (act of God)	10	0	5	0	0	0.33	**32**
	Social and cultural causes	12	3	0	0	0	0.24	**40**
	Environmental limitation	4	7	4	0	0	0.4	**26**

Appendix 6 Causes of Delay from the consultant perspective

Consultant Perspective								
		Consultant					**Consultant**	
		5	**4**	**3**	**2**	**1**	**RII**	**RANK**
Client/Owner Related Causes	Delay to provide and deliver the site to the contractor	3	5	6	2	0	0.71	**15**
	Late in revising and approving design documents by owners	7	2	0	4	3	0.675	**18**
	Financing difficulty	9	4	1	1	1	0.837	**6**
	Delay in progress payments for completed works	2	4	2	2	3	0.487	**37**

	Slow in decision making	2	1	8	5	0	0.6	**25**
	Low communication and harmonization	8	0	4	4	0	0.75	**10**
	Scope change and Variation Orders	2	0	8	4	2	0.55	**30**
	Unrealistic contract period	5	0	1	7	3	0.562	**28**
	Suspension of works	5	2	8	1	0	0.738	**11**
Contractor Related Causes	Low Project management system	10	2	1	1	0	0.78	**8**
	Late start & resource mobilization to site	8	6	2	0	0	0.89	**3**
	Difficulty in project financing(Low financial system)	9	6	1	0	0	0.9	**2**
	Improper construction methodology and Reworks	4	1	9	2	0	0.688	**16**
	Disagreement and conflict with Consultant and client	4	2	4	4	2	0.625	**23**
	Delay in sub-contractors works	2	2	4	4	4	0.525	**35**
	Incompetent project staffing	4	2	2	2	6	0.55	**30**
	Insufficient contractor Experience	2	2	4	6	2	0.55	**30**
	Delay in material endorsement prior to delivery to site	4	0	6	2	4	0.575	**26**
Consultant Related Causes	Inaccurate Site investigation Report	2	0	4	4	6	0.45	**39**
	Delay in issuance of designs and working drawings	2	2	4	6	2	0.55	**30**
	Delay in payments endorsement for completed works	2	4	6	4	0	0.65	**21**
	Delay in test and review of works	4	2	6	2	2	0.55	**30**
	Design errors and complexity of designs	4	0	2	2	8	0.475	**38**
	Lack of qualified supervisors on site	2	2	8	6	0	0.675	**18**
	Low communication with team and other stakeholders	4	2	6	2	2	0.65	**21**
	Lack of detailing in BOQ ,designs and specification	2	0	4	4	6	0.45	**39**
	Insufficient experience of consultant	2	0	8	2	2	0.5	**36**

Resource related Causes (Material, Equipment and Man power)	Availability of skilled and unskilled labor	0	0	2	4	10	0.3	**42**
	Machineries distribution problem	0	3	7	6	0	0.562	**28**
	Availability of local materials and sourcing	3	13	0	0	0	0.835	**7**
	Low productivity of labor	3	3	8	2	0	0.687	**17**
	Low quality construction materials	4	12	0	0	0	0.85	**4**
	Equipment availability on demand	2	1	6	7	0	0.575	**26**
	Lack of local construction materials in market	9	7	0	0	0	0.912	**1**
	Lack of availability of imported construction materials and goods on market	0	11	3	3	0	0.737	**12**
External Causes	Changes in Regulations and Rules by government	4	8	0	2	2	0.725	**13**
	Price Escalation	6	4	2	2	2	0.725	**13**
	Force majeure (War, Conflict, Riot and violence)	8	2	0	0	6	0.675	**18**
	Sudden site conditions	4	8	4	2	0	0.85	**4**
	Weather and natural disaster (act of God)	4	8	2	2	0	0.775	**9**
	Social and cultural causes	0	2	8	2	4	0.45	**39**
	Environmental limitation	0	8	2	6	0	0.625	**23**

Appendix 7 causes of delay from the client perspective

Client Perspective								
		Client					Client	
		5	4	3	2	1	RII	RANK
Client/Owner Related Causes	Delay to provide and deliver the site to the contractor	7	5	3	1	0	0.83	8
	Late in revising and approving design documents by owners	5	6	2	2	1	0.75	12
	Financing difficulty	5	6	1	3	1	0.737	13
	Delay in progress payments for completed works	3	8	2	2	1	0.725	16
	Slow in decision making	1	5	6	3	0	0.612	28
	Low communication and harmonization	6	4	3	3	0	0.862	5
	Scope change and Variation Orders	1	2	7	4	2	0.55	35
	Unrealistic contract period	3	6	1	5	2	0.675	22
	Suspension of works	1	6	5	3	0	0.625	26
Contractor Related Causes	Low Project management system	6	5	3	1	2	0.812	10
	Late start & resource mobilization to site	8	6	2	0	0	0.88	4
	Difficulty in project financing(Low financial system)	9	4	2	1	0	0.862	5
	Improper construction methodology and Reworks	6	2	6	1	1	0.737	13
	Disagreement and conflict with Consultant and client	5	5	3	1	2	0.725	16
	Delay in sub-contractors works	7	2	2	3	2	0.712	18
	Incompetent project staffing	5	2	1	1	7	0.562	34
	Insufficient contractor Experience	5	1	6	2	2	0.662	24
	Delay in material endorsement prior to delivery to site	5	6	3	0	3	0.762	11
Consultant Related Causes	Inaccurate Site investigation Report	3	2	2	4	5	0.525	37
	Delay in issuance of designs and working drawings	3	2	4	7	0	0.613	27

	Delay in payments endorsement for completed works	3	5	6	1	1	0.7	**19**
	Delay in test and review of works	3	4	6	2	1	0.675	**22**
	Design errors and complexity of designs	5	0	1	1	9	0.487	**39**
	Lack of qualified supervisors on site	3	2	5	2	4	0.575	**33**
	Low communication with team and other stakeholders	5	2	2	1	6	0.587	**32**
	Lack of detailing in BOQ ,designs and specification	2	0	6	2	6	0.475	**40**
	Insufficient experience of consultant	3	1	5	1	6	0.525	**37**
Resource related Causes (Material, Equipment and Man power)	Availability of skilled and unskilled labor	0	0	1	5	10	0.287	**42**
	Machineries distribution problem	11	3	2	1	0	0.937	**3**
	Availability of local materials and sourcing	2	14	0	0	0	0.82	**9**
	Low productivity of labor	3	3	8	2	0	0.687	**20**
	Low quality construction materials	6	12	0	0	0	0.975	**1**
	Equipment availability on demand	2	1	6	8	0	0.6	**30**
	Lack of local construction materials in market	11	3	3	0	0	0.95	**2**
	Lack of availability of imported construction materials and goods on market	0	11	3	3	0	0.73	**15**
External Causes	Changes in Regulations and Rules by government	2	8	1	1	4	0.637	**25**
	Price Escalation	9	4	1	1	1	0.837	**7**
	Force majeure (War, Conflict, Riot and violence)	6	1	0	1	8	0.55	**35**
	Sudden site conditions	4	3	1	5	3	0.6	**30**
	Weather and natural disaster (act of God)	5	5	0	4	2	0.687	**20**
	Social and cultural causes	1	1	3	5	6	0.425	**41**
	Environmental limitation	1	7	1	6	1	0.612	**28**

Appendix 8 Respondents Information

Respondent Gender	
Male	25
Female	22
male	53.10%
female	46.80%
Respondent Status	
project manager	4
construction head	4
site engineer	8
siteinspector	0
resident engineer	3
office engineer	7
project coordinator	6
contract admin	10
others	5
Respondent Educational level	
Bachelor Degree	35
Masters Degree	12
Advance level	0
PHD	0
Other	0
Respondent year of experience	
0-3 YEARS	6(13%)
3-5 YEARS	19(40%)
5-10 YEARS	14(30%)
ABOVE 10 YEARS	8(17%)